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Differentiation of writing and drawing by U.S. two- to five-year-olds

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ABSTRACT

To investigate preschoolers' knowledge about symbol systems, we compared the written and drawn productions of 2–5-year-old U.S. children. In Study 1, children (N = 88) wrote and drew four targets, including their own name and a picture of themselves. Children differentiated writings from drawings in the implements they used, the size of their productions, and their use of recognizable letters. Some distinctions were present in the youngest children and others became more prominent with age. In Study 2, adults (N = 16) who judged whether the productions were writings or drawings performed above the level of chance for all age groups. Adults did better for children's names and self-portraits than for other targets, suggesting that the name plays a leading role in U.S. children's learning about writing. Overall, the results show that children begin to learn about formal differences between writing and drawing at an early age.

1. Introduction

Use of symbolic systems, including writing, drawing, numbers, and maps, is a hallmark of human beings, and learning about these systems is an important part of children's development. Here we focus on two symbol systems that children in literate societies need to master: writing and drawing. These systems are similar in that they are used to represent and convey ideas and sentiments. This is done, in both systems, by making marks on surfaces. Our research examined when U.S. children begin to differentiate writing and drawing in production and how they do so.

Although the distinction between writing and drawing seems obvious to adults, young children sometimes seem to confuse the systems. For example, they may say that they "read" pictures (Ferreiro & Teberosky, 1982) or "draw" their names (Robins & Treiman, 2009). Children must learn that, although writing and drawing both communicate ideas, the two notation systems look somewhat different and function in different ways. For example, a drawing of a cat normally looks like its referent but the written word does not. Writings tend to be small and to be made with dark lines, whereas drawings are larger and often colored. English words generally contain more than one letter and so occupy a roughly rectangular space, whereas drawings can be of various shapes.

Tolchinsky Landsmann and Karmiloff-Smith (1992) hypothesized that children learn early on about the formal properties of different notation systems, although it may take them longer to learn how the systems are used to refer and communicate. Tolchinsky Landsmann and Karmiloff-Smith found experimental support for this view when studying the differentiation of writing and numbers by children of around 4–6 years old. Other studies show that children of this age have learned about some of the differences in form between writing and drawing and that they can make some of these distinctions in their own productions. For example, Brenneman et al. (1996) asked 4–6-year-old U.S. children to draw and write various targets. Children were more likely to make linear productions

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while writing than while drawing, and they were more likely to fill in their productions and use colors appropriate for the target while drawing. Gombert and Fayol (1992) reported that 3–6-year-old French children were more likely to make productions containing linear, segmented units created in the left to right direction when writing than when drawing.

There is mixed evidence about whether Tolchinsky Landsmann and Karmiloff-Smith's (1992) hypothesis about early knowledge of formal distinctions between different notation systems extends to children under 3 or 4 years of age. In an influential study, Levin and Bus (2003) asked Israeli and Dutch children to write and draw various targets and later classify their productions as written or drawn. Mothers of children of the same ages as those in the study also classified the productions in this manner, either classifying the productions of a single child or all children's productions of a single target. In addition, judges scored the productions on a scale that was designed to assess the degree to which a production looked like writing. Levin and Bus concluded that children's writings can be distinguished from their drawings beginning around 4 years of age. One piece of evidence, however, did not support this conclusion—the finding that mothers performed significantly above the level of chance at distinguishing between 2-year-olds' writings and drawings, pooling across the two countries, when they judged the productions of a single child. It is possible that children begin to produce some differences between writing and drawing earlier than 4 years of age and that the other measures used by Levin and Bus lacked sensitivity.

Other researchers have argued that even children under the age of 3 show some knowledge of formal differences between writing and drawing and some ability to reproduce these differences in their own productions. Yamagata (2007) made this argument for Japanese-speaking 2-year-olds, as did DeFord (1980) and Rowe (2008) for English-speaking 2-year-olds. However, these studies are not conclusive because few targets were produced (Yamagata, 2007) or because characteristics of productions were not examined quantitatively and no statistical analyses were presented (DeFord, 1980; Rowe, 2008). Stronger evidence comes from Treiman and Yin (2011), who asked Chinese children to write and draw several targets and who reported quantitative analyses of a number of characteristics of their productions. Even the 2-year-olds in this study made some distinctions between writing and drawing. When writing, for example, they were more likely to use dark implements and to choose grid paper, which Chinese schoolchildren use to practice writing characters. Moreover, adults who were asked to classify the productions as writing or drawing performed significantly above the level of chance with the productions of 2-year-olds.

In the present study, we examined the ability of U.S. preschoolers to differentiate writing and drawing in their productions. Our study was similar to that of Treiman and Yin (2011), extending it to children from a different cultural background who are exposed to a writing system that is quite different in appearance and functioning from that of Chinese. For example, English writing contains many curved and circular forms, whereas Chinese characters do not. Our first research question was when U.S. children would make detectable distinctions between writing and drawing, and in particular whether children under the age of 3 or 4 would do so. To address this question, Study 1 used the same targets used by Treiman and Yin with Chinese children, asking U.S. 2–5-year-olds to write the words for fire, sun, water, and their name and to draw these same targets and a picture of themselves in the drawing task. In Study 2, adults judged the productions as writing or drawing. We expected that older preschoolers would make somewhat different productions in the writing and drawing tasks and that adults would perform above the level of chance when asked which productions were made under instructions to draw and which were made under instructions to write. If the same was true of younger preschoolers, this would support the hypothesis of Tolchinsky Landsmann and Karmiloff-Smith (1992) that, from a very early age, children are sensitive to some of the formal properties of different notational systems. It would show, moreover, that this sensitivity is not limited to children from a single culture learning a particular writing system.

Our second research question concerned the specific formal properties that children associate with writing and drawing. To address this question, we measured and analyzed various characteristics of children's written and drawn productions in Study 1, going beyond previous studies that used a single scale to assess the degree to which productions possessed characteristics of writing (e.g., Levin & Bus, 2003) or that did not report statistical analyses (DeFord, 1980; Rowe, 2008). One characteristic that we investigated concerns the tools that children use to make their productions. If children have learned that writing tends to be dark in color, they may use dark implements for writing more often than for drawing and colored implements more often for drawing. We also investigated whether children who chose a colored implement picked a color that was appropriate for the object. Some studies have suggested that children sometimes use object-appropriate colors to write, for example choosing a red pen to write the word 'tomato' (Levin & Bus, 2003; Levin & Tolchinsky-Landsmann, 1989). However, Treiman and Yin (2011) found little evidence of use of object-appropriate color in the writing of Chinese children. We also examined the type of paper that children chose. As mentioned previously, Treiman and Yin found that Chinese children were more likely to pick grid paper to write than to draw. If U.S. children do the same, this could suggest knowledge that linearity is characteristic of writing. That is, even though grid paper is not often used for writing in the U.S., children may consider it appropriate for this purpose because it contains lines. Given that English words are small and usually longer than they are tall, we also asked whether U.S. children's writings tended to be smaller and more rectangular than their drawings.

Our third research question was whether children are better at making the distinction between writing and drawing with their names than with other targets. This question is of interest in light of the theory that children's names play a leading role in literacy development (e.g., Both-de Vries & Bus, 2010; Haney, 2002; Levin & Aram, 2005; Treiman & Broderick, 1998). When Levin et al. (2005) asked Israeli and Dutch children to write their own name and several other words, they found that 2–5-year-olds showed more writing-related qualities, such as linearity and segmentation, in their productions of their name than in their productions of other targets. Although these results support the idea that children's names play a leading role in literacy development, the results of Treiman and Yin (2011) do not support this idea, in that adults who were asked to classify Chinese children's productions as writing or drawing did not perform better with children's names and self-portraits than with children's written and drawn versions of other targets. We asked in the present study whether U.S. children's written productions of their names show more writing-related qualities